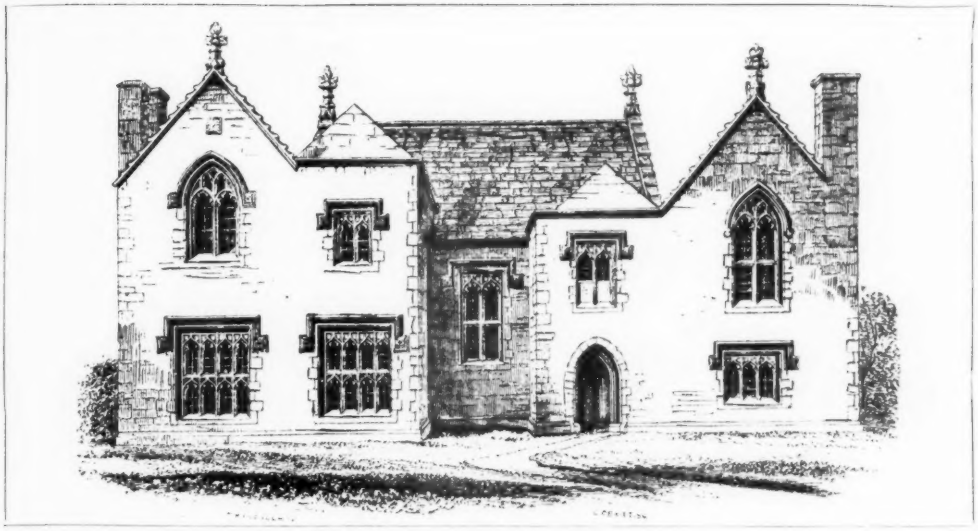


Kingston Seymour, Somersetshire. Fifteenth Century.

ENGLISH ARCHITECTURE OF THE FIFTEENTH CENTURY.

By W. H. Wood (Newcastle-on-Tyne).

Read before the Northern Architectural Association, 10th February 1904.

THE phase of Gothic architecture which had its beginning in the latter half of the fourteenth century, reaching its full development in the fifteenth, continuing into the sixteenth, and in some places into the seventeenth century, is the culmination of the style which had been gradually evolved out of the Romanesque during the three preceding centuries.

Perpendicular work is worthy of special study for several reasons. First, there is its exclusively national character, which distinguishes it from its forerunners. Norman, Transitional, Early Gothic, and Decorated are found on the Continent, and it was not till the latter part of the fourteenth century that the development took place which gave us a style entirely our own. Although it has certain features in common with the Flamboyant of the Continent, the general effect of the two styles is very different, the English work being much more reserved.

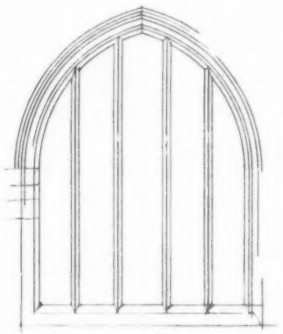


FIG. 1.
EAST WINDOW, EGGLESTON ABBEY.

It is very interesting to trace the first beginnings of the style. These, indeed, in some cases are very far back; as, for instance, in the east window of Evington Church, Leicester, *circa* Edward I., the characteristics of Perpendicular are shown. In the east window of Eggleston Abbey [fig. 1], dating about 1220, the mullions are carried straight up to the arch. These, however, are more what might be called anticipations; the real development is seen in the later examples of Flowing Decorated tracery. At Durham Cathedral the large window of the north transept [fig. 2] and the west window illustrate the gradual introduction of the vertical bar which later became the distinguishing mark of the style.

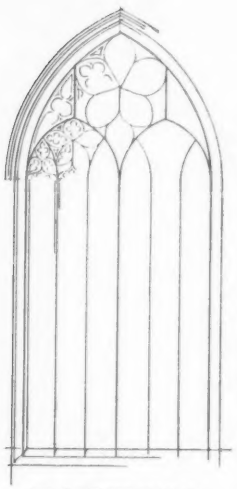


FIG. 2.—NORTH TRANSEPT, DURHAM.

The Transition style between the Decorated and Perpendicular is a well-marked one, possessing certain features common to both, as the segmental arch and acute gablet of the Decorated, with the vertical tracery bar and low-pitched gable of the Perpendicular. The small chapel in the centre arch of the west front of Peterborough Cathedral and Merton College Chapel, Oxford, are examples ; the Bishop's throne at Durham is another.

MOULDINGS.

The fully developed Perpendicular is distinguished by several characteristics peculiar to itself. First, the mouldings are no longer worked on receding orders and stopped on caps at the springing of arches, but are now worked on the chamfer plane, and in most cases only certain members rest on caps, and the others continue down the piers or jambs.

These mouldings are often of great vigour and beauty. They consist of combinations of the following members :—(1) the hollow ; (2) the boutell ; (3) the ogee ; (4) the double ressaut or double ogee ; (5) the wave ; (6) the casement or wide hollow.

CAPITALS.

The upper portion of the capitals and the lower parts of the bases are always octagonal. There is great elegance about both these features ; the capitals are frequently enriched with either battlements or cresting on the abacus ; the bell may be either plain or foliated.

In Somerset the capital of a clustered shaft is often treated as one, a wreath of foliage running right round ; but the general practice was to use capitals sparingly on shafts separated by hollows or groups of mouldings. In some cases the capitals are very small, as in the cloisters at Worcester and the chancel arcade of St. Mary's, Lowgate, Hull. In other instances they are very tall, as on the chantry of Prince Arthur in Worcester Castle and the porch of Lavenham Church.

BASES.

The bases are much higher than in the preceding style ; in piers this was done to raise them above the level of the fixed seats with which churches were being furnished at this time. They usually commence with an astragal and bell, with or without other members below ; and this part is generally circular, resting on an octagonal plinth, often of several stages. In piers with shafts the bases of the shafts are frequently at a different level from that of the main pier. External bases to buildings are of the same profile, but often have bands of quatrefoils or other ornament, producing a very rich effect. Sometimes the base is stepped up and carried round a door like a label.

PIERS.

Piers are often either formed of four shafts separated by four large hollows, or are octagonal ; in the latter case the caps are sometimes omitted, and the arch-moulds die into the shaft, as in the cathedral ; an arrangement which Professor Willis rather unhappily terms the "discontinuous impost." Piers are often mullion-shaped, the long axis being north and south, and consist of shafts and groups of mouldings. They are sometimes arranged with the minor axis not in the centre of the major axis. Piers are sometimes panelled, the panels generally being continued into the arch without a cap. This, on a large scale, produces a remarkably fine effect, as at Sherborne Minster.

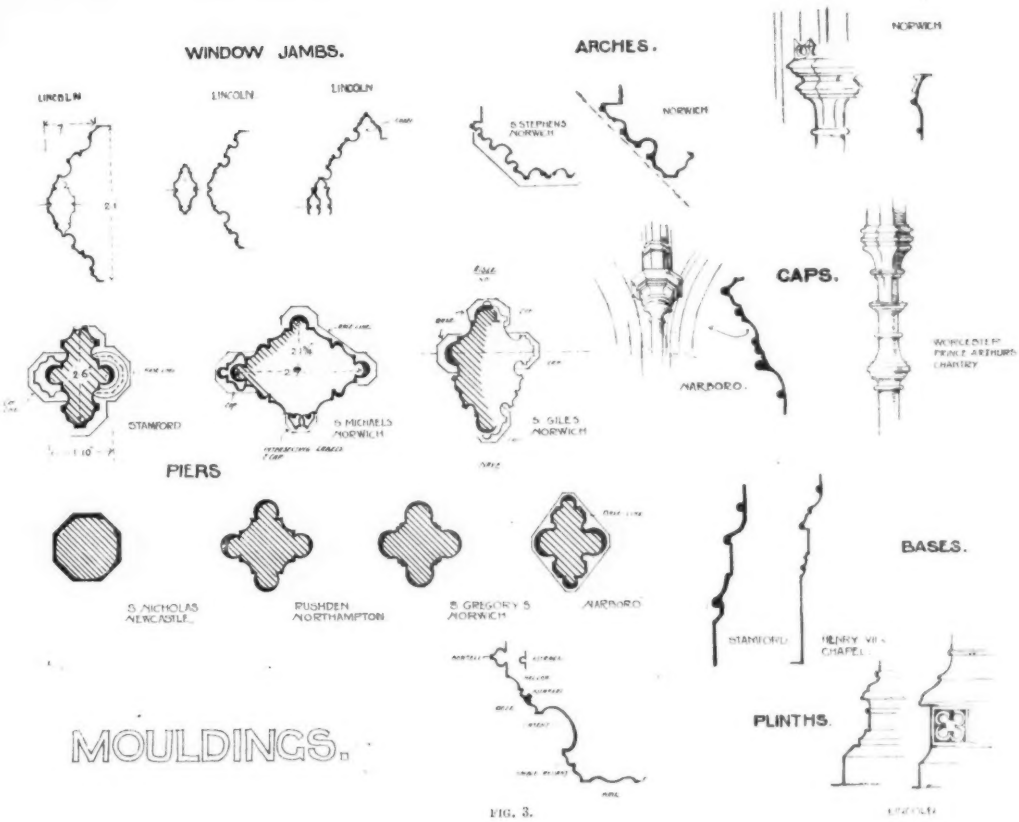


FIG. 3.

ARCHES.

One of the most marked changes was in the introduction of the four-centred arch: an immense improvement upon the segmental round or segmental pointed. They are generally used first in doors and windows, and only late in the style for pier arches. Four-centred arches vary a good deal in shape, depending upon the relative position of the centres for the large and small curves. The pier arches at Winchester are only apparently four-centred, being really three-centred, the lower curves being struck from one centre: a form suggested by the arches of the Norman building, which was being then transformed into a Perpendicular one. The general rule for four-centred arches is to divide the space into four equal parts, striking the small curves with one part as radius, though these centres produce lines down below the springing to a distance equal to the space, and from these points strike the large curves.

DOORWAYS.

Doorways have commonly four-centred arches with a square label over them, instead of a hood-mould, the spandrils being filled in with tracery or carving, coats-of-arms being often introduced. Some examples are of great beauty and richness. Where a hood-mould is used,

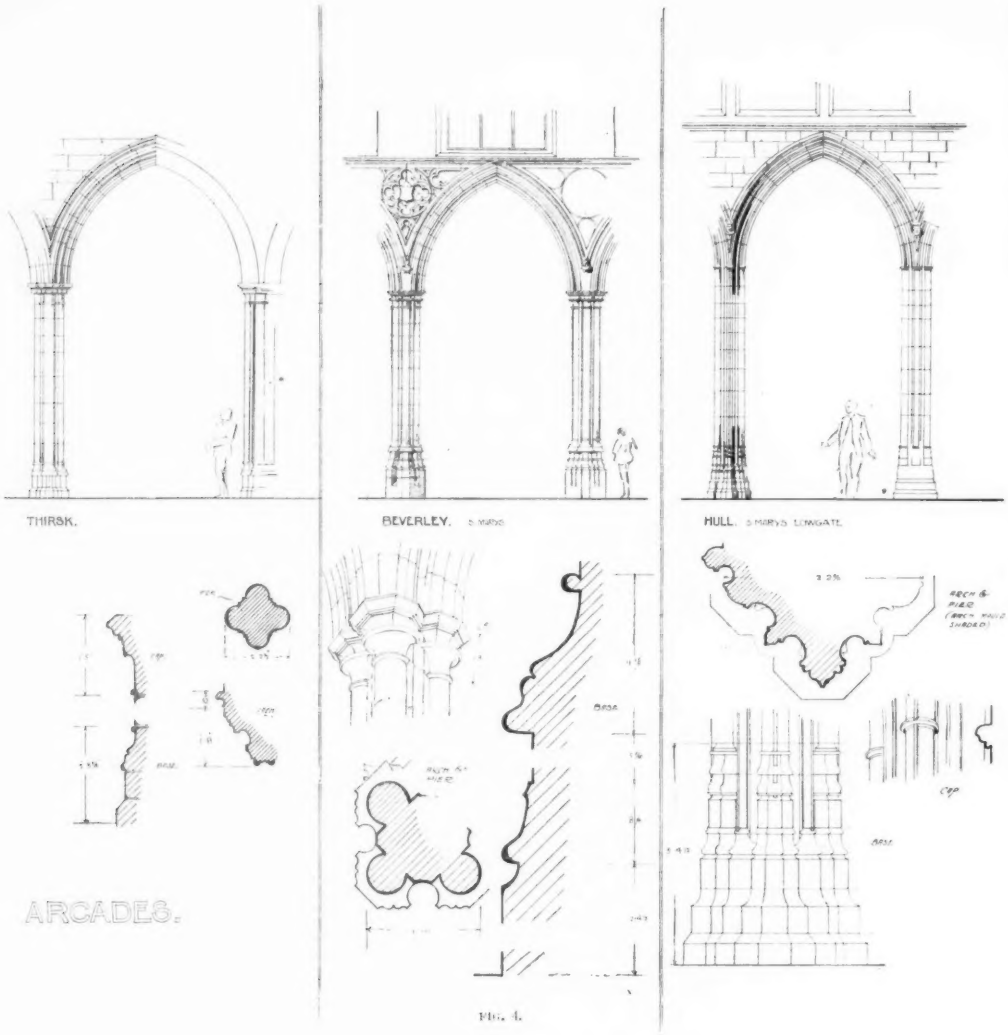


FIG. 4.

following the line of the arch, it is sometimes carried up in an ogee outline and terminated in a finial or niche; or it may be carried up as a straight-sided gable, as in the magnificent north porch of Beverley Minster. Doorways in this style are sometimes wonderfully rich with carving and niches, now, alas! generally empty. The west doorway of Bridlington is a fine example. The doors themselves are often covered with the most elaborate tracery, as at Thirsk, St. Albans Abbey, &c.

WINDOWS.

But it is in the windows that the leading characteristic of verticality is most manifest. The mullions no longer stop at the springing of the arch, but run on until stopped by the arch

itself. The variations of Perpendicular tracery are innumerable, and the possible combinations endless. A few of the principal types may be described. There is, first, the simple, where the mullions run straight up and the head is subdivided into "batement' lights by other vertical bars. Secondly, the compound, where the window is divided by arched bars into smaller windows. Some compound windows are of enormous size, as the east window of York and the east window of Gloucester. Thirdly, the transomed, where the lights are crossed by transoms, either plain, embattled, or with cresting, with or without tracery below, and crossing either in a straight line or at different levels. They are frequently introduced in the tracery itself. The most beautiful form is the traceried transom, often with inverted cusped arches.

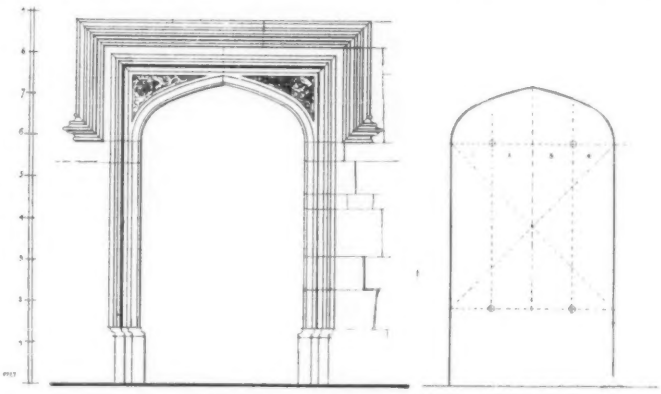


FIG. 5.—DOORWAY, CHRIST CHURCH, OXFORD.

Transoms give great strength to the mullions, and in very large windows are a necessity unless buttressed mullions are used or double tracery; even in this case they often occur,

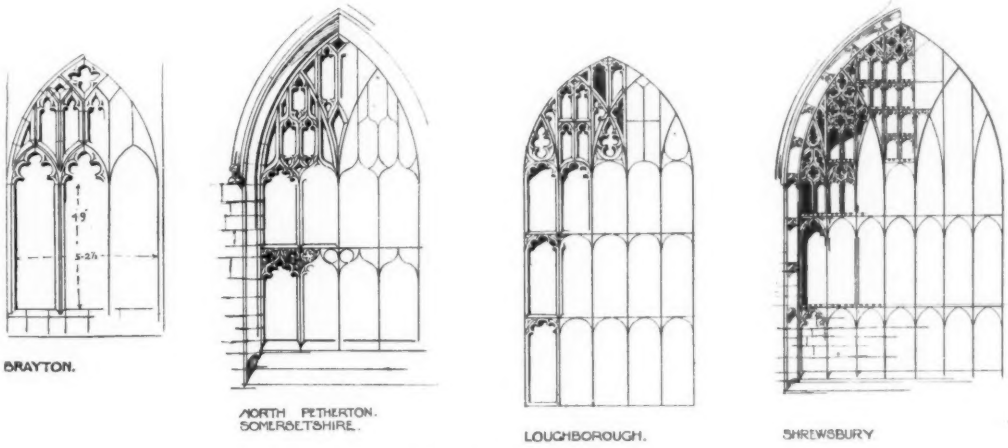


FIG. 6.—WINDOW TRACERY.

being then richly vaulted underneath, as in the east transepts of York, and forming a pathway connecting the triforia, as in the north transept window at Durham. In many cases, especially where four-centred arches are used, the tracery commences below the springing line with the most happy effect. Often the traceries of the different lights begin at varying levels, the centre light being kept high to give more room for the principal subject in the painted glass.

I have referred to buttressed mullions: these are used occasionally in very large windows to strengthen the principal mullions, as in the west window of Gloucester. Sometimes statues in canopied mitres occur on the mullions, as in the west windows of the aisles of Bath Abbey.

The square-headed window was a great favourite both in ecclesiastical and domestic work, and is capable of great variety of treatment.

The wide-mullioned windows of houses and other buildings of this period are often of great size. Another feature of special beauty is the oriel and bay window. These are often most elaborately panelled, with enriched cornices and panelled or pierced parapets. There is no doubt that the square-headed mullioned window is a most satisfactory feature both from a practical and from an æsthetic point of view; this is shown by the persistency with which it has continued in use up to the present time.

One peculiarity of Perpendicular windows worth mention is that in many cases the glass plane is in the centre of the wall, and the section of the jamb and arch is the same inside and out, as at St. George's Chapel, Windsor.

PANELLING.

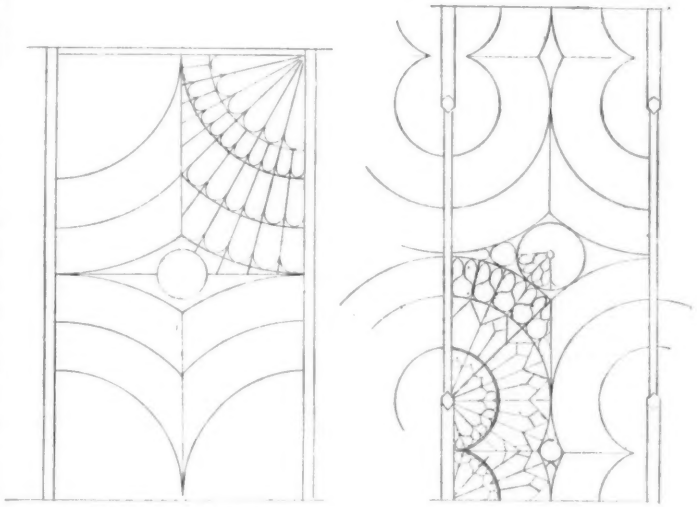
With regard to the enrichment of buildings of this period we find that wall arcading and diapering have been superseded by panelling: a system of decoration which we find carried out in the most complete manner in Henry VII.'s Chapel at Westminster. Panelling is often of the most surprising delicacy and richness, at other times displaying strength and vigour. There is nothing that gives such an effect of loftiness as these strong vertical lines of wall panelling, as we find it used in the most elaborate buildings, giving an effect of dignity and richness not to be obtained by any other method. Sir Charles Barry was well aware of this fact when he designed his great masterpiece, the Houses of Parliament.

In some buildings the windows are merely formed by piercing portions of the panelling which covers the wall. In the flint districts the panelling is formed of freestone mullions and tracery, not moulded, and filled in flush with dressed flints, as at Southwold.

VAULTING.

It is in the vaulting that we find the crowning glory of the style. With the beginning of the new style there appears the fan vault, a system entirely different constructionally from the vaulting previously in use. Hitherto, after the Norman period, vaulting had been formed by arches dividing the space to be covered into compartments and supporting a thin shell of stone; but in fan vaulting, in its simple form, constructional arches are dispensed with; a conoid of stone of uniform thickness springs from the vaulting shaft, and the surface of the conoid is decorated by radiating tracery ribs intersected by horizontal bands of tracery—a form of decoration at once the most beautiful and logical, a vaulting shaft, with its spreading ribs rising from it, rivalling the grace of the palm tree with its spreading fronds. The spaces between the conoids, or, more correctly, between the uppermost horizontal bands, are either decorated with tracery or pendants, which latter give the most surprising grace to the vault. These merely ornamental pendants are not to be confused with the constructional pendants which really carry a portion of the vaulting, as in the roof of the Old Divinity Schools at Oxford and that of Henry VII.'s Chapel. This latter is perhaps the most beautiful roof which the genius and skill of man has ever erected—indeed, the chapel as a whole is one of the most beautiful edifices in the world. In this roof, the construction of which I show [fig. 7], there are strong arches dividing the vaulting into oblong bays: one voussoir on each side is prolonged, ending in a pendant from which a conoid springs and meets the conoid springing from the wall, thus avoiding the awkwardness which otherwise occurs in an oblong bay by the

conoids meeting so much sooner in one direction than in the other, as at King's College Chapel, Cambridge [fig. 7]. The earliest example of fan vaulting is in the splendid cloisters at Gloucester.



King's College Chapel, Cambridge. Henry VII.'s Chapel.

FIG. 7.—DIAGRAMS OF VAULTING.

Fan vaulting is an exclusively English invention, there being no examples outside this kingdom, and is one of which we may justly be proud. In it we have the perfection of the stone roof, which had all through the Middle Ages been regarded as the most dignified way of covering a building. The stone roof gave a unity and completeness not obtainable by a wooden roof, and in later Gothic buildings the arrangement of the vault gave the key to the plan, the points of support and resistance all being arranged to suit it.

WOOD ROOFS.

Wooden roofs were used for the great majority of buildings, and are of several types:

(1) The hammer-beam; a form capable of the most elaborate treatment. In this system the tie-beam is cut away, a collar holding the principals together at the top, and these being prevented from spreading by bending by the increased depth given by the braces below. These roofs depend to a great extent for their stability on the oak pins, and in many cases where these have given way the roof has spread and pushed the walls out of plumb. The ends of the hammer-beams are frequently decorated with angels with outspread wings, as in some of the grand Norfolk churches.

(2) The arched principal roof, the Westminster Hall example being the most elaborate. In principle this is similar to No. 1.

(3) The wagon roof, in which the construction of framed rafters is concealed by a wood or plaster ceiling in either arched or canted form and decorated by moulded ribs often with carved bosses at the intersections.

(4) The tie-beam roof, usually of low pitch and with considerable camber given to the sturdy tie-beam, which is assisted by curved wall struts. The tie-beam carries vertical struts which support the principals, the spaces between the struts being often enriched by tracery. The details of this kind of roof are often very beautiful, and they are very sound constructionally, exerting no thrust and forming a very effective tie across the building.

ROOF PITCH.

The pitch of the roof was lower than was generally the case in earlier work, and was usually concealed by a parapet often richly ornamented. In the battlements it is usual for the coping to mitre round the merlons, instead of being cut off square; this has a much better

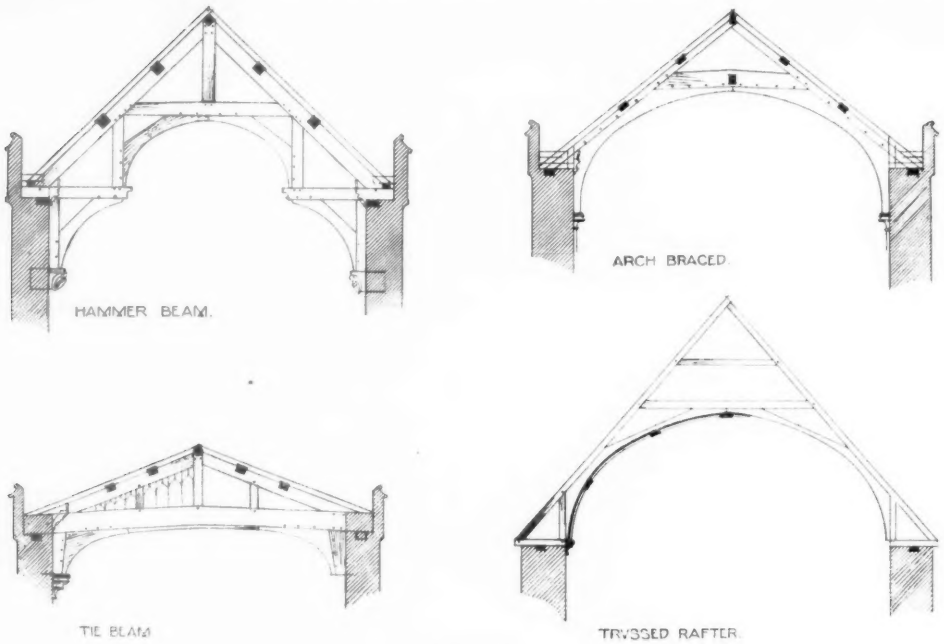


FIG. 8.—ROOFS.

effect. There is a sturdiness and gravity about the low-pitched gable which has a charm of its own, and harmonises with the four-centred window so often accompanying it; while the studied outlines of the buttresses, with their offsets arranged to give a somewhat parabolic outline, complete the effect of stability.

BUTTRESSES.

Buttresses may stop below the parapet, or have pinnacles standing above, or end with flat-topped caps to receive figures, as at the Beauchamp Chapel, Warwick; St. George's Chapel, Windsor; and the Lady Chapel at Peterborough, where the statues still remain. The slopes are frequently curved and the general outline curved, as in the magnificent buttresses added to support the Galilee Chapel at Durham. Buttresses, like other features, are often panelled, as at Lavenham, and frequently have niches for statues. Sometimes octagonal turrets are used in lieu of buttresses, as in the tower of St. John's, at Newcastle, and the cathedral, and at Henry VII.'s Chapel, where they terminate in cupolas. As the style advances these cupolas become more frequent and of larger size, and we must not overlook the fact that these, though only used as the terminations of turrets, are really domes invented quite independently of Classic tradition or Renaissance influence.

CHURCH PLANNING.

In the churches of the fifteenth century there is a distinctly different effect from those of earlier periods. The cruciform plan is now abandoned in favour of the parallelogram, and the structural division between nave and chancel is often omitted, the arcade and clerestory being continuous, and the ritual separation of the chancel being obtained by a screen and the frequently increased richness of the roof of the sanctuary.

CLERESTORIES.

These continuous clerestories, of which there are such noble examples in the churches of Norfolk, give a lightness in complete contrast to the comparative darkness of the upper part of early churches only lighted by small and unimportant windows, as at Warmington. So beautiful were they felt to be that the majority of early churches had clerestories added in the fifteenth century. The aisle windows are now of greatly increased size, and occupy in many cases the entire space between the buttresses, which have to be increased in projection to give compensating strength. The buildings were now constructed on more scientific principles, and the arrangement of supports and the equilibrium of the structure more carefully considered, the necessary counterpoise to the thrust of the vault or roof being given in the most economical way without the use of vast masses of solid wall. In fact, the wall has become merely a filling, the piers, arches, and buttresses forming the skeleton of the structure.

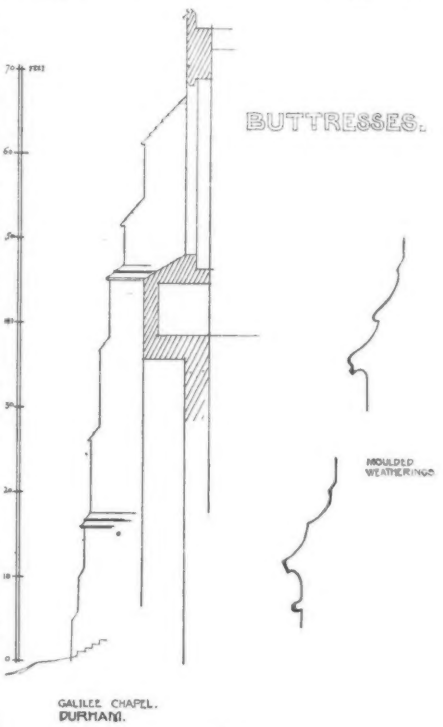


FIG. 9.

TOWERS.

The towers of this century are without doubt the most beautiful of any period, those of Somerset being generally admitted to be the finest, the most admirable proportion and carefully studied outline being combined with exquisite detail. Among the finest is Taunton.

The great charm of these towers is in the arrangement of the buttress offsets so as to give an effect of entasis as well as of diminution, and this outline is obtained from every point of view. There is no doubt that these towers were drawn on the diagonal as well as front elevations, and not merely the latter, as is the practice of the modern architect, and so often with such very unhappy results. Fifteenth-century towers rarely have a vertical outline unless they have polygonal angle turrets, as at Sedgefield; the Magdalen tower, Oxford; and St. John's, Newcastle.

In cases where for economical reasons buttresses were dispensed with the towers diminish by offsets at the successive stories in a way at once simple and effective, as at St. Margaret's, Durham. The difference of effect produced by this curved tapering and the vertical outline of the earlier towers is well seen at Durham by comparing the outline of the fifteenth-century central tower with the Norman transitional western ones. These latter towers, by the way, owe a good deal of their effect to the imitation Perpendicular parapet and pinnacles with which they are now finished.

The octagonal lantern was an early feature that survived, and was treated with great success, as at Boston, All Saints Pavement, York; and Coventry.

The great majority of towers of this date are flat-topped and terminated by a parapet which in plain examples is finished with a simple battlement. In more ornate work this

parapet is ornamented with surface panelling, or it may be pierced, and usually has pinnacles at the angles. In many cases there are one or more intermediate pinnacles on the faces of the tower, and in elaborate specimens, as Taunton, the whole arrangement of parapet and pinnacles forms a glorious crown to the edifice. This example has hanging flying buttresses springing from gargoyles on the main cornice and supporting the great angle pinnacles. The angle pinnacles are generally admirably proportioned with regard to the tower, and, as at Gloucester and Canterbury, are of most elegant outline. They may be placed either as the upward continuation of the angle buttresses, or may stand on the cornice without any connection with the buttresses below, as at York.

The general effect of these towers is most satisfying, and, however beautiful the spire of the early ones may be, there is a stately dignity about the square tower, with its coronet of parapet and pinnacles, which more than compensates for the loss of height.

SPIRES.

When spires are used they are well proportioned, the broach of earlier days being discarded, and the spire now rising from behind a parapet. The entasis formerly used is omitted, the spire lights either omitted or much reduced in size, and the relative height of the spire to the tower increased. At Hemingbrough, in Yorkshire, the spire is twice the height of the tower, the latter being 60 feet, and the total height of tower and spire 180 feet. This is a charming example.

Polygonal towers are sometimes used. There is an hexagonal one at Cotswold, in Yorkshire.

WOODWORK.

The woodwork of this style is not the least of its beauties. We have comparatively little woodwork earlier than the end of the fourteenth century, but after that time we find innumerable examples of beautiful work in screens, pulpits, lecterns, font-covers, stalls, bench-ends, doors, &c. Many of the screens are of great magnificence, and in spite of the unfortunate destruction of many there are still a great number left. Oak was the material used, and it was nearly always decorated with colour and gilding. In many cases this is still remarkably fresh, and in most examples traces of it can be detected.

The principal feature in the interior of a church at this date was the rood screen stretching across the entrance to the chancel, and often continued across the side aisles. The lower part is solid to about 3 feet high, with panels often with paintings of saints or the nine choirs of angels. Above this are mullions with tracery, and a bold cornice usually carried on fan or other vaulting, and consisting of one or more bands of carving surmounted by a cresting. There is a splendid example in Aysgarth Church, in Wensleydale, brought from Jervaulx Abbey. Upon the screen stood the rood, a crucifix, with attendant figures of St. Mary and St. John. It is improper to use these figures when there is none on the cross, as in our cathedral, as St. Mary and St. John left before the body was taken down, and did not stand gazing at the empty cross. Often there was a panelled parapet on the boldly canopied top of the screen, forming the rood loft in which a concealed choir or a small organ was sometimes placed. The expression a "pair" of organs used by old writers does not mean two instruments, but is used as some people use the term when they speak of a step-ladder as a pair of steps. The screen at Hexham Abbey is a fine example of one with loft. The access to the lofts was by winding stairs in one or both piers of the chancel arch, or in turrets built specially for the purpose. The traces of these stairs and doors can often be seen, as at the cathedral of St. Andrews. In addition to the rood screen there were others at the side of the chancel

separating it from the aisles, besides screens forming enclosures to altars in other parts of the church.

In cathedrals there were numerous altars with their enclosing screens. Screens were also used to enclose chantry chapels. There is a good example at Hexham in the screen to the Ogle shrine. There are traces in all old churches showing where the head beams of the

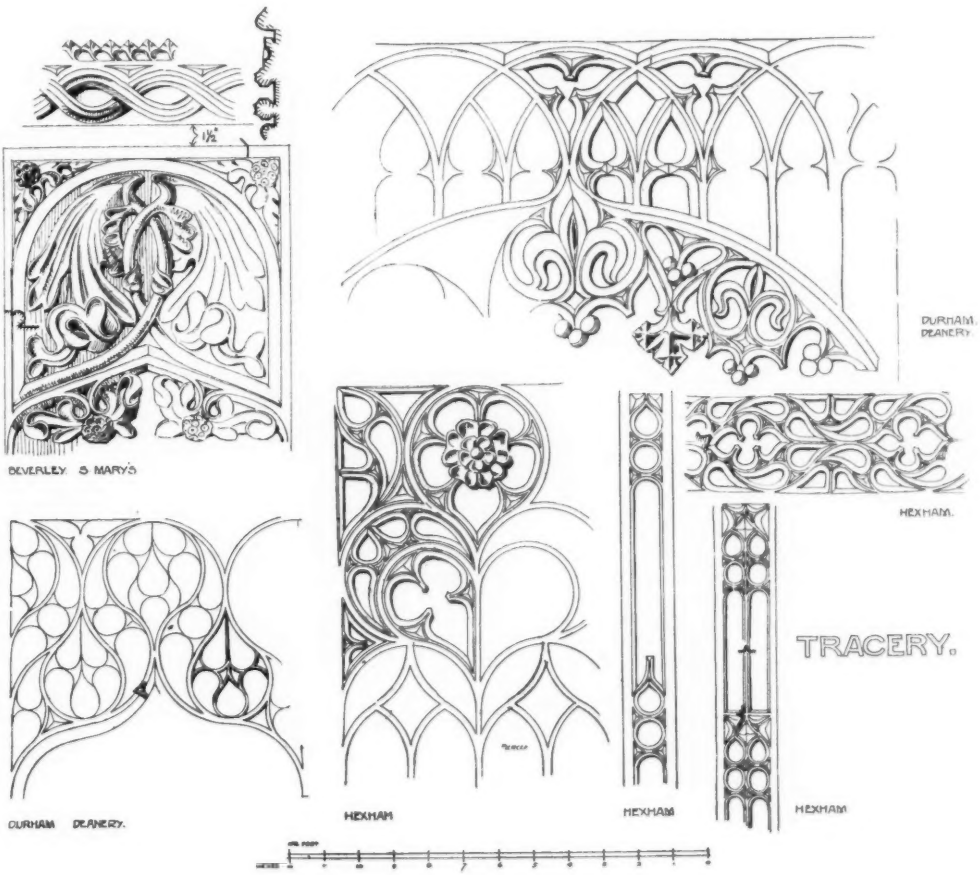


FIG. 10.

screens were let into walls and pillars. This is very noticeable at Durham in the chapels of the transepts.

One of the great mistakes made by our early restorers was the removal of screens in order to obtain a vista. A vista is still looked upon by many people as the great thing to strive after. They fail to appreciate the element of mystery which accompanies partial concealment and the pleasure of discovering new beauties and objects of interest by degrees, instead of having everything staringly visible. Can anything be more charming than the eastern portion of Westminster Abbey, with the chapels screened off from the aisle, and the way new beauties unfold themselves as one walks round towards the entrance to Henry VII.'s Chapel?

There is perhaps no place which possesses the charm of mystery in such degree, or gives one a better idea of what a great church of the Middle Ages was like.

One peculiarity of Perpendicular woodwork should be pointed out—viz. that as the style matured the tracery became more flowing and more varied. In much of it there is not a rectangular feature.

There is a very beautiful piece of work in Brancepeth Church, near Durham, fixed above the chancel arch, and supposed to have come from Durham Cathedral. It is a coved canopy divided into thirty-nine panels by moulded ribs with carved bosses at the intersections and each panel filled in with tracery of a different design. This work is oak and not ivory, as often asserted. There is some beautiful panelling round the hall of the Deanery at Durham with varied tracery of more or less flowing type. Tracery formed solely by intersecting arches is not uncommon.

Beautiful work is found in bench-ends and stalls, of which magnificent examples exist at Ripon, Chester, &c. Those in Henry VII.'s Chapel are particularly fine. The canopies which surmount the stalls are all on much the same general plan, consisting of diminishing polygonal stages finishing with a crocketed spire. Those at Durham, though of Renaissance work, are an imitation of the earlier ones, and are of very good outline, but the detail is poor. There are some very fine carved bench-ends in the chapel of the Castle at Durham, and two, evidently by the same hand, at Wensley Church. Bench-ends are in old work nearly always got out of thick stuff, so as to get plenty of depth for the tracery and carving, and to this they owe a great deal of their success.

IMITATIONS.

The architects of the fifteenth century appear to have had great respect for the work of their predecessors, and often adapted their work to it. The nave of Westminster Abbey is a well-known example where the design and proportions of the Early English choir are faithfully kept, and the difference of date can only be detected by the mouldings, showing that they considered their own sections superior—an opinion I think many will share. In this example the Early English wall arcade is faithfully copied, although this form of decoration had been superseded by panelling. At Hemingbrough the arcade on the south side of the chancel is an imitation of Early English, even to the characteristic three-lobed leaves in the caps: this is early-sixteenth-century work.

At Durham, in the Galilee Chapel, the coupled marble columns of the transitional Norman period have been carefully copied in freestone by the fifteenth-century architect; while at Pickering, in Yorkshire, is an example of fifteenth-century Norman. Thus we see that the imitation of earlier styles did not originate with the architects of the eighteenth and nineteenth centuries, as is generally supposed, and for which practice they are so often condemned; indeed, in slavishly copying old work and misapplying it to totally different purposes from those for which it was originally used they certainly lay themselves open to condemnation. This has been done by both schools, though the classicist of the eighteenth century who tried to force the architecture of Greece into uses for which it was not adapted was more in error than his nineteenth-century successor who tried to build Early Gothic mansions. There is, however, no more reason why we should not take the fully developed Gothic of the fifteenth century, and, carrying it on a stage further, adapt it to modern requirements, than that the architecture of the Renaissance should not be used for present-day purposes. We have justification for it in its exclusively national character, while its greater lightness of design, the possibility of obtaining any area of window surface desired without losing scale, the absence of the large entablature which is so apt to lead one into bad arrangements of windows above and below,

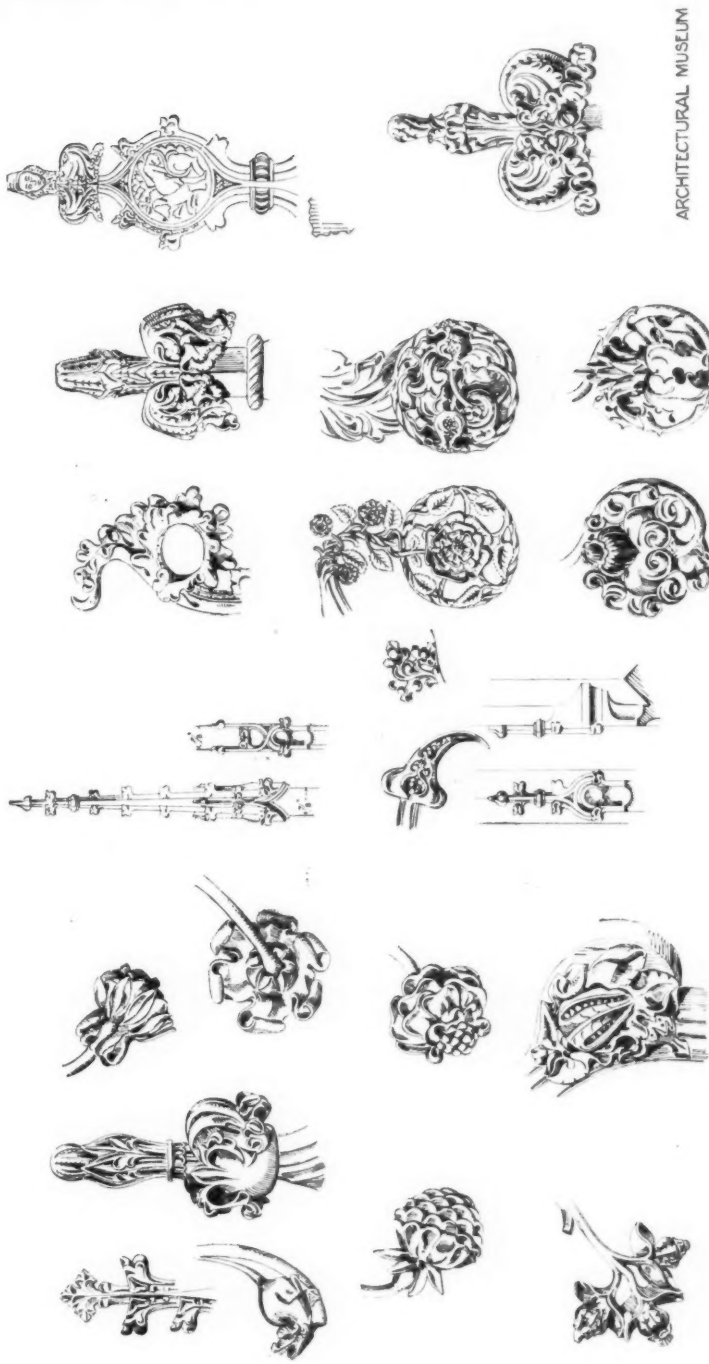
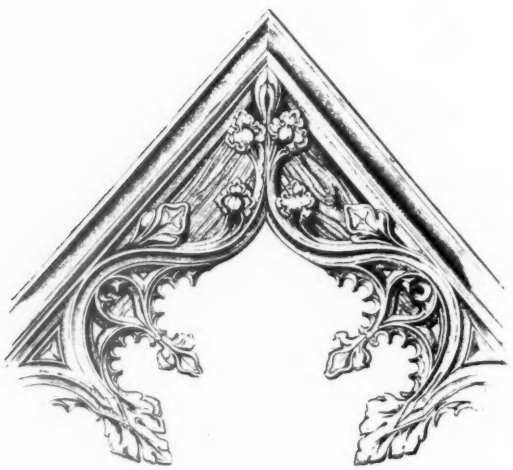


FIG. 11

and the great elasticity of the style, render it peculiarly suitable for modern business requirements.

Among the most beautiful works of this style are the chantry chapels and tombs, which are full of the most varied and beautiful details. The measuring up and drawing out of these is quite an education in Perpendicular, as they are in most cases the work of experts in their profession, and constitute perfect miracles of art. I hope that young students who have heard me will be induced to study Perpendicular work perhaps more than they have done, and make measured drawings of such examples as they may come across. I would particularly impress upon them the advisability of getting mouldings and details, full size, on the spot. In wood tracery work the nosing can often be impressed on the paper with the finger, and the cusping and details filled in by hand. It is always advisable to measure with a view to making a finished drawing afterwards; but where there is no time for this, at least one or two leading dimensions should be taken, as with a good sketch these prove very helpful; for example, in a sketch of a window carefully made and in proportion, if one is only able to get the width of a light and the breadth of a mullion, it is much more useful for reference.



NOTE SUR DEUX ÉPURES ÉGYPTIENNES CONSERVÉES À EDFOU.

By Auguste Choisy [*Hon.Corr.M.*],

ROYAL GOLD MEDALLIST 1904.

SUR la terrasse du portique de la cour du temple d'Edfou (côté Est), on distingue deux épures que nous reproduisons [figs. 1 et 2]. Ces épures—à grandeur d'exécution—sont tracées sur des dalles de grès assez rugueuses, et devaient sans nul doute disparaître sous un enduit. Gravées avant l'application de l'enduit, elles sont à peu près contemporaines du gros œuvre, ce qui autorise à les dater de l'époque ptolémaïque. L'une d'elles [fig. 1] a été publiée en 1896 dans l' "Intermédiaire des Mathématiciens," par M. Bouriant. L'autre [fig. 2] est, croyons-nous, inédite et semble une variante de la première. On y aperçoit, aux points marqués par la lettre x, des signes distinctifs bizarres : sur l'une, un pied humain ; sur l'autre, deux.

Si l'on admet que les recoupements de lignes R et R′ sont des repères indiquant la position de l'axe, l'épure 1 donne une corolle à tige grêle ; l'autre, une corolle à tige épaisse. Et si l'on attribue aux deux variantes la même hauteur totale, soit $1^m\ 80$, on obtient pour l'une la silhouette fig. 3, pour l'autre le contour fig. 4.

Que représentent ces deux tracés ? Généralement on les considère comme des études pour un profil de corniche en forme de gorge. Nous voyons à cette explication plus d'une difficulté : 1° L'indication très nette d'un socle massif, peu compatible avec l'idée d'une corniche. 2° La répétition [fig. 1] du profil en contre-partie à droite et à gauche d'un axe de symétrie. Que l'architecte ait disposé, à droite et à gauche de cet axe, deux tracés plus ou moins différents, cela peut à la rigueur se concevoir ; mais reproduire identiquement le même profil eût été un travail en pure perte. Sans nul doute l'épure 1 est celle d'une figure de révolution : nous sommes en présence d'un objet en forme de corolle, s'épanouissant au sommet d'une tige tronc-conique, et reposant sur un socle.

Le fût grêle est presque nécessairement métallique ; l'autre peut être de pierre. Quant à la matière de la corolle, l'absence de toute indication d'épaisseur donne à penser quelle était de métal. Le profil a de frappantes analogies avec celui d'une cuve découverte à Suse par M. de Morgan ; or la cuve susienne est faite de trois feuilles de métal appliquées l'une sur l'autre. Le détail de cette curieuse fabrication n'a pas, que nous sachions, encore été analysé de près : mais, à coup sûr, la technique susienne s'adapterait à la corolle d'Edfou. Ainsi il paraît fort admissible : 1° que la tige et la corolle étaient circulaires ; 2° que la corolle était de métal battu.

Quelle était la destination de cet élégant objet ? Par son aspect général il se rapproche beaucoup d'une table, d'un autel d'offrandes figuré dans la *Description de l'Egypte* (tom. ii.

pl. 90) ; c'est cette attribution qu'adopte M. Bouriant. Les objections qu'elle soulève sont la hauteur de 1m 80, qui rendrait pénible le placement des offrandes, et le rebord en pente sur lequel ces offrandes risqueraient de glisser. Qu'il nous soit permis de risquer une autre conjecture : Le profil en coupe-larme et la structure métallique conviendraient à merveille pour une vasque de fontaine. Une photographie que nous a obligeamment communiquée M. Phené Spiers prouve qu'il existait dans la cour du temple romain de Balbek un bassin de fontaine ; serait-il inadmissible que des fontaines eussent fait partie des dépendances des temples ptolémaïques ? Nous ne hasardons cette hypothèse que sous toute réserve ; mais l'existence à Balbek d'un bassin et, à Edfou, d'une vasque utilisable pour une fontaine sont deux faits qui méritent tout au moins d'être rapprochés.

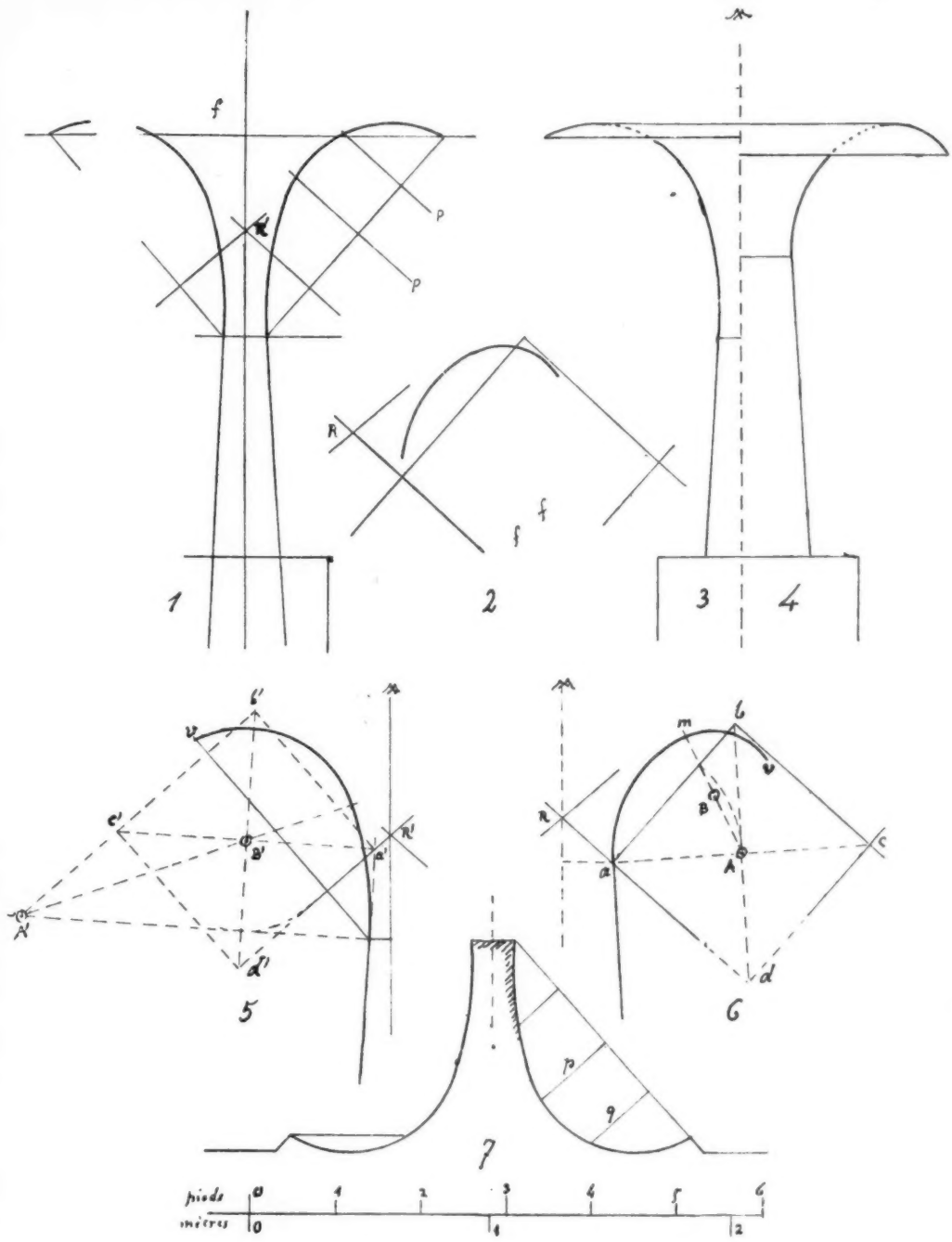
Quelle que soit la destination, les épures d'Edfou ont leur intérêt au point de vue de l'histoire des méthodes, parce qu'elles permettent de ressaisir, dans deux exemples authentiques, le caractère essentiellement géométrique des profils égyptiens. Envisageons d'abord la variante épure 2 ; nous commençons, par elle, parce qu'elle contient l'indice manifeste des données graphiques qui ont servi à l'établir. On y distingue [fig. 6] un carré *a b c d* dont le sommet *a* correspond à la naissance du profil en gorge. Le côté de ce carré est 0m 75. Calculant la diagonale, on trouve 1m 0606. Elle représente 3 fois le pied philétérien de 0m 3555 (0,3555 × 3 = 1,0665). La diagonale *a c* de ce carré est la donnée initiale. Dirigée perpendiculairement au fût, elle nous fournit en A le centre de l'arc *a m*. Cet arc se termine en un point *m* que l'on obtient en prenant sur le côté *a b* du carré générateur une longueur *a n* égale à la demi-diagonale, et tirant A *n m*. Prenons le milieu B du rayon A *m* : il donne précisément le centre du second arc *m v*. La courbe est à deux centres, et les positions de ces centres sont A et B.

Passons à l'épure 1. Il est probable qu'elle est conçue d'après le même esprit et que, eu égard aux sujétions de la gravure sur grès, les lignes utiles ont seules été conservées. Et en effet [fig. 5] un carré identique à celui de la fig. 6 donne la clef de tout le tracé. Le rayon du cercle inscrit à ce carré est 0m 375. Élevons sur le fût, au point choisi pour la naissance de la courbe, la perpendiculaire *s* A'. À 0m 375 au-dessus, menons-lui une parallèle, et établissons sur cette parallèle le carré générateur *a' b' c' d'*. Soit B' le centre de ce carré ; le profil sera, comme le précédent, une courbe à deux centres dont voici les positions : Le premier arc *s m'* a son centre au point A' déterminé par la rencontre de la ligne *s* A' avec le prolongement du côté *b' c'* ; et la droite A' B' *m'* fournit en *m'* le point où se termine le premier arc. Le second arc *m' v'*, qui se raccorde avec le premier en *m'*, a son centre au point B' lui-même, et s'arrête en un point *v'* déterminé par une droite *s v'* issue de la naissance *s* et parallèle au côté du carré.

Telle paraît être la génération des courbes. Incidemment on remarquera que le caractère de courbes à deux centres les rapproche des profils mêmes des voûtes surhaussées de l'Egypte.

Non seulement la géométrie domine les formes, la métrique règle les dimensions. Dans le tracé fig. 1 la hauteur totale est de 5 pieds. Dans les deux tracés l'inclinaison des arêtes du fût est au $\frac{1}{11}$; et le diamètre du fût, mesuré à la naissance des courbures, est dans un cas $\frac{1}{4}$, dans l'autre $\frac{6}{5}$ de pied.

Reste une question : la signification des traits *p* et *q* de l'épure 1. Ces traits ne jouent aucun rôle dans le tracé de la gorge ; leur espacement n'est qu'à peu près uniforme, et les points où ils rencontrent la courbe n'ont rien de remarquable. Voici, croyons-nous, comment ils se justifient. Pour exécuter [fig. 7] le moule sur lequel fut martelé le cuivre, il fallait se guider à l'aide d'un contre-profil, d'un "gabarit" ; et ce gabarit, comme ceux dont nous faisons usage aujourd'hui, était un châssis à claire-voie composé de planchettes assemblées. Les traits *p* et *q*, en apparence superflus, auraient marqué la position es traverses.


f
R
p
p
1
2
3
4
5
6
7
pieds
mètres

9, Conduit Street, London, W., 27*th August* 1904.

CHRONICLE.

The Institute Visit to Newcastle, 6th to 8th October.

A brief outline of the arrangements for the Institute visit to Newcastle-on-Tyne appeared in the last number of the Journal, p. 482, and further details are now appended. The President, Past Presidents, and Council of the Northern Architectural Association will form a reception committee to welcome the visiting members on their arrival on Thursday evening, 6th October, at the County Hotel, which will be the headquarters of the Institute during the visit. Mr. Alderman Andersen, Mayor of Newcastle, will receive the visitors in the Council Chamber at the Town Hall at 10 a.m. on Friday, and deliver an address of welcome on behalf of the City of Newcastle. The members will then proceed to the Lecture Theatre of the Institute of Mining and Mechanical Engineers in Neville Street, where about an hour will be devoted to the reading and discussion of a Paper, "Specialism in Architecture," Mr. John Belcher, A.R.A., *President*, in the chair. The remainder of the morning will be occupied in visiting the Cathedral Church of St. Nicholas and Trinity House, and the visitors will be entertained at luncheon at the County Hotel by the Northern Architectural Association. In the afternoon of Friday visits will be paid to places of interest in the city and neighbourhood, including Jesmond Dene House, the residence of Sir Andrew Noble, K.C.B., and St. George's Church, returning through Jesmond Dene.

The President will hold a reception, and the Annual Dinner of the Institute will take place, on Friday evening, at the County Hotel.

On Saturday arrangements will be made, for those who desire to do so, to visit Hexham Abbey and the Roman Station at Chollerford. The Museum at Chesters will be visited, by the kind permission of Mrs. Clayton, on whose estate part of the Roman Wall is situated. Under the guidance of Mr. Frank Caws [*F.*], *Past President N.A.A.*, a visit will be paid to the new ship-building sheds at Messrs. Swan & Hunter's, Wallsend.

Members desiring to be of the visiting party or to be present at the Annual Dinner are requested to communicate with *The Secretary R.I.B.A.* at as early a date as possible. The Northern Association has in preparation a Handbook for the visitors, comprising a programme of the arrangements, particulars of hotel accommodation, a map of Newcastle, and a guide to the various places of interest in the city and neighbourhood.

Leeds & Yorkshire Society: Architectural Education.

A school of architecture is now established in connection with the Leeds and Yorkshire Architectural Society. The classes are conducted by arrangement with the University of Leeds and the Leeds Institute at their respective institutions. The curriculum, covering nearly the whole of the subjects required for the Institute Examinations, is as follows:—

Preliminary.—Elements of plane geometry; geometrical drawing; elements of perspective; elementary mechanics and physics; freehand drawing from the round.

Intermediate.—History of Mediæval and Renaissance architecture; theoretical construction; descriptive geometry; elementary applied construction.

Final.—Design (subjects quarterly adjudicated upon by the Council of the Society); nature and properties of building materials (this class is held at the Society's rooms and conducted by its own lecturer); arrangement and construction of buildings in relation to health; specifications and estimating.

In addition to the above courses, the University of Leeds gives instruction in mathematics, mechanics, civil engineering, sanitary law, drainage and engineering problems; and the Leeds Institute in drawing, painting, designing, modelling, and carving. The Society arranges visits of inspection to buildings and courses of evening lectures, and offers annually various prizes. The Society's library, comprising 584 volumes, is lodged with the Leeds Central Public Library, where members may obtain the books on loan.

Classes for architecture (Lecturer, Mr. F. Musto [*A.*]) are held at the City of Bradford School of Art, special attention being given to the preparation of the testimonies of study required for the R.I.B.A. Examinations. It is intended, on the completion of the new School of Art buildings, to bring the teaching still more into line with the Institute examinations, architectural design being especially kept in view.

Edinburgh School of Art.

At the Royal Institution School of Art, Edinburgh, under the Board of Manufactures, the architectural curriculum extends over five years. The study of Classic, Renaissance, and Mediæval arts, colour, decoration, modelling, figure-drawing, perspective, and sciography, and their application, forms the basis of the training. Arrangements have just been made for a course of lectures on

architectural history, to be given next winter, specially for students preparing for the R.I.B.A. examinations.

St. Bartholomew the Great.

Mr. W. Arthur Webb [*A.*], of 27, Nottingham Place, W., writes :—

"As a lover of old buildings, and especially our London churches, I venture to call the attention of our members to the work of restoration still in progress at the Church of St. Bartholomew the Great. May I suggest that we follow the example of another periodical, in its shilling subscription for a statue to Milton, and have a similar fund for those who would like to show practical sympathy in assisting the rector and churchwardens in this good work? I should be pleased to forward and acknowledge subscriptions on behalf of the committee."

The Royal Victorian Institute.

From the Royal Victorian Institute of Architects have been received the bi-monthly parts composing the first volume of their *Journal of Proceedings* commenced last year. The work is edited by a committee of members, and is very tastefully produced under the direction of Mr. Blamire Young, of Melbourne. The illustrations, all of them line-engravings, the head-pieces, tail-pieces, pictorial advertisements—everything in the book, in fact—appears to have been designed and arranged by the same hand. The ordinary half-tone process block employed for the great bulk of modern book illustrations is dropped altogether.

Among the many interesting papers is one by Mr. Percy Oakden [*A.*] advocating on behalf of the local architectural student the establishment in Melbourne of an Architectural Museum. The Australian student naturally works at a disadvantage compared with the home student in being completely cut off from the noble and precious architectural monuments which the latter has so close at hand. Mr. Oakden's museum would have courts illustrative of the leading forms of architecture in its more important periods in different parts of the world. The courts would be stored with casts of architectural detail, and illustrations representing the development and perhaps the ultimate decay of the style indicated. Each court would be hung with photographs exhaustively illustrating the style, and its literature would be separately exhibited in a branch library attached to the court. The building would include a large hall for popular lectures, and rooms for class-teaching. Every description of work bearing on architecture would be illustrated—stained glass and decorative treatment of every kind, as well as casts and illustrations of more constructive ornament. Mr. Oakden realises that in its complete form such a museum would be a costly and extensive affair, and that at present it can only be considered as a dream of the future. He suggests, however, that a beginning might be made at once by forming a collection of photographs, and grouping and classifying them on the lines indicated. Students might thus visit in thought the architectural wonders of other countries, and trace the progress and features of architectural styles in a far more realistic manner than can be done by reading alone. Judging by the discussion, the meeting was in favour of the proposition, and promises of support were given to the scheme should effort be made to carry it into effect.

There is a cleverly written paper on "Garden Design in Relation to Architecture," by Mr. W. R. Butler, who insists on the necessity of architectural character in the design of a garden, and that therefore it should be designed by an architect. Every architect, the author observes, knows that if designing were left to the plumber the house would be covered with pipes, or if left to the plasterer it would be a mass of vagaries in plaster ornament. One tradesman cares nothing for the work of another in equally important parts of the structure. So in gardening, the horticulturist or landscape gardener has not the broad grasp of things that is necessary to successful garden design.

The other papers are: "Standards of Size, Quality, and Strength in Relation to our Building Contracts," by Anketell Henderson; "Design of Australian Country Houses," by Chas. A. D'Ebro; "Some Thoughts on Architectural Design," by Robert J. Haddon; "Melbourne's Ever-flowing River," by W. Thwaites, engineer-in-chief to the Melbourne and Metropolitan Board of Works; and "The Streets of Melbourne from an Architectural Point of View," by W. M. Campbell.

The late Frank Manoah Kent [*F.*].

Mr. Edwin O. Payne [*A.*], of Durban, sends details of the tragic death, on the 7th ult., of Mr. F. M. Kent, of Pietermaritzburg, who was elected a Fellow of the Institute only so recently as last February. Mr. Kent had had occasion to reprimand his house-servant, a native, and the latter shortly after entered the room where his master was sitting at breakfast, and shot him through the head from behind with a revolver. Finding him not dead a few minutes later, he fired two more shots at him with fatal effect.—Mr. Kent, after serving his articles with Messrs. W. F. Hemsoll and J. Smith [*F.*], of Sheffield, came to London as assistant to Messrs. Beeston and Burmester [*F.*], and afterwards to Mr. E. W. Mountford [*F.*], remaining with the latter about three years. He went to Natal in 1894, and in partnership with Mr. Matthew B. Price [*F.*] had carried out some important works in the colony, including the Girls' Model Government School, Durban, the Diocesan College for Boys, Balgowan, the Agricultural Hall, Estcourt, and various hotels.

PLENUM VENTILATION AND THE ROYAL VICTORIA HOSPITAL, BELFAST.

The Architects and Engineers of the Belfast Hospital send the following reply to Mr. Bibby's remarks on this subject in the last JOURNAL:—

The persistent misstatements of Mr. G. H. Bibby are our excuse for occupying more space in the JOURNAL. His calculations are altogether erroneous; for, even if fair comparison could be made between the old, overcrowded, badly ventilated hospital, with inadequate heating and hot-water supply, and the new one, it would stand thus, as regards the average coal consumption per *resident provided for*—viz. in the old, 3 tons; in the new 4½ tons, the latter including laundry work and other conveniences which found no place in the old, for since the new buildings were occupied, the efficient heating, ventilation, and hot-water supply have been kept up throughout, although the full complement of residents has not been attained. So much for his figures.

Although there appeared an appreciative article by Mr. Bibby on "Plenum Ventilation" in the *Local Government Journal* of May 1903, his remarks on the ventilation of this Hospital are so evidently prejudiced that previously we ignored them. He has, however, appealed to the printed annual report for verification of the accuracy of his statements; how, then, did he overlook this, which appears on page 17?—viz.: "The staff desire to express their great satisfaction with the new hospital, which is fully answering their highest expectations." Also an official statement made at the last ordinary meeting of the Board of Management, reported in the *Belfast News Letter* of 8th July, which runs thus: "Now that the system of ventilation has been thoroughly tried both in summer and winter, a proper estimate can be formed of its merits, and the opinion of the hospital staff is that it is a great success."

In face of such evidence from those who have had daily experience of its working, it can only be supposed that Mr. Bibby was mistaken in his observations; a charitable interpretation is that he was following in the wake of a nurse or attendant whose clothes had become saturated with antiseptics—not an unusual occurrence where surgical operations are conducted.

It would appear from his remarks that there is lack of outlook for the *majority* of the patients; but it is only to the separation wards, accommodating in all thirty-two out of a total of 300, that no ordinary windows are provided; yet those and the larger wards are better lighted and as cheerful as the average of hospital wards. We can assure Mr. Bibby that he need have no fear of a breakdown of the ventilating arrangements or of the disastrous results which he anticipates, for they exist only in his imagination.

On recently visiting the hospital careful inquiries were made, but no confirmation was forthcoming as to his statements. He was not shown over, or even seen, by the superintendent, neither could diligent search discover his doctor afflicted with headache. Moreover, there is not a word or figure in the annual report to confirm what he advances. The tabulated statement of expenditure, page 47, refutes his charge of extravagance in the new hospital, for notwithstanding additional coal consumption, the average cost *per patient treated* has been less. These are the figures:

	Cases treated.	Total cost.	Average per case.
For year 1902	2,007	£9,381 11 4	= £4 13 6
„ „ 1903	2,298	10,509 15 9	= 4 11 0½

Or, as the superintendent recently said to us: "The patients and staff are now better housed, better fed, better cared for, and perform their duties with greater comfort than in the old hospital, at practically the same cost per head."

There may be nothing very extraordinary in this; but when Mr. Bibby goes out of his way to condemn, and appeals to a document to confirm his statements, we give these quotations therefrom to show what reliance can be placed on his accuracy.

He may be reminded that it is no fault of the architects or engineers that every bed is not occupied. The committee wisely provided for future requirements, and it is not very surprising that, in addition to paying off the cost of the new buildings, funds are not at once forthcoming for nearly double the number of patients. Many of the beds have never been occupied; it is therefore a misuse of terms for him to state they have been "closed," particularly as he implies that the coal bill is responsible.

Mr. Bibby must surely know that his unreliable statements (to describe them mildly) are not only ungenerous, but apt to mislead his brother architects on a subject of considerable importance to the health and well-being of his fellow creatures.

WILLIAM HENMAN &
THOMAS COOPER, } *Architects.*
HENRY LEA & SON, *Engineers.*

10*th August* 1904.

THE BRITISH ASSOCIATION.

Municipal House-owning.

Dr. William Smart, Adam Smith Professor of Political Economy in the University of Glasgow, delivered the address in the section of Economic Science and Statistics, taking for his subject the Housing of the Poor and the method of dealing with the problem adopted in Glasgow. The real housing problem of to-day, he said, narrowed itself down to this: How far did the experience gained point in the direction of the municipality itself building and owning houses for certain of the poorer classes?

For a municipality, deliberately and of set intention, to add a new competitive industry to its already manifold activities was a serious matter from three points of view. (1) House-owning was a business, neither a routine business nor one where success was certain. So far as it had not a monopoly, a municipality could not presume upon demand—could not command a remunerative sale for what it provided. As a builder, it had advantages and disadvantages; as an owner, it had also advantages and disadvantages—particularly, perhaps, in that it had a conscience. Assuming, however, that a municipality could manage its enterprises as well as private citizens managed theirs, and that its house-owning covered all recognised expenses and ran no risk of coming upon the rates, what must be emphasized was that it pledged the future ratepayers for the security of all the capital borrowed. It was short-sighted to conceal the dangers and responsibilities of this by calling such a debt "productive." Borrowed capital changed into stone and lime certainly remained an "asset," but whether the asset was worth much or little or nothing depended on the value which future generations would put upon it. A tenement of houses, by change of circumstances, might lose its rent-producing capacity and call only for demolition long before it had suffered much deterioration as a building. In such circumstances the ideal kind of house would be one constructed to last, say, thirty years at the outside. But this, of course, was the last thing that municipalities in their present mood would think of doing, and they generally made it impossible by their own building regulations. Besides this, there was the consequence of the "economic trespass"; dwelling-houses for the poor generally took up the space of buildings of a more remunerative character, and so kept down the rateable value of the area, while increasing its expenses. (2) The municipality entered into direct competition with many of its own ratepayers, competing not only with the comparatively small class of builders, but with the great class of owners of house property. Free competition of producers to serve the public was, of course, a good thing, and in nothing, perhaps, was it more desirable than in the purveying of houses, where the length of time required for erection tended to some extent towards monopoly. But competition was good because and to the extent that it kept down prices by increasing supply, and the action of a municipality working with money borrowed at a gilt-edged security rate was very likely to have the opposite effect; it might result in a positive diminution of the total supply of houses, and so a rise of rent, by reason of the discouragement given to private builders through the appearance of a rival with whom they could not compete on equal terms. (3) By pledging the public credit for a new debt, and adding a new activity and responsibility to already overworked members of the municipality, it *pro tanto* prevented the expansion of municipal activity in other directions. These were considerations against municipal building and owning derived from the general principles which should, in his opinion, regulate all municipal expansion. They were not, of course, decisive against it, but they suggested that very definite and weighty reasons must be put forward on the other side.

Productive Value of a Healthy House.

It was far too little realised, Dr. Smart observed, that a sanitary and comfortable house among quiet neighbours had a "productive value," and was, quite definitely, one of the factors of wage-earning; in other words, a good house, as compared with a slum, brought with it the possibility of paying a higher rent for it. In view of the actual circumstances of slum life in every large city, and in view of the hopelessness of escape on the part of the low-paid wage-earner from contagious influences, there seemed *prima facie* a strong case for the provision of at least one and two roomed houses by an agency which would aim primarily at affording to the tenants the conditions of health, morality, and efficiency, not only in the construction of the houses, but in their continued administration and control. He had always held that the owning of poor-class property carried with it a moral responsibility which was not escaped by the owner shutting his eyes and leaving the administration to his factor; and, on similar grounds, much might be said for a municipality owning and letting all the small houses within its area. This would at least secure a "clean city." Such a position, then, was quite intelligible as a counsel of perfection, and it might be worth consideration in the case of a city planned, like a garden city, from the beginning. But, in the actual circumstances of our cities, he mentioned it merely to bring out his point. For there was no proposal before any municipality of to-day of taking over and making a monopoly of the supply of small houses, or even of building all the small houses in the future. The utmost that had been proposed was the building and letting of a limited number of such houses in direct rivalry with private builders and owners. And the question which must be answered was, on what principle, or with what view, was this limited proposal made? If it were to afford an experiment and an object-lesson, as was done with the happiest results in the case of the corporation lodging-houses in Glasgow, where the rise in the standard not only swept out the old and very objectionable lodging-houses, but led to the large increase of private "models" competing successfully with the municipal ones, there would probably be nothing but approval. But if the proposal was made in the full recognition that such an experiment was not an object-lesson, inasmuch as it could not be followed by private enterprise; if the reason given

for it was that a certain class of tenants could not pay the rent which private enterprise must have if it was to continue its supply, and that the municipality, as having command of capital at a very low rate of interest, could afford to undersell the market rents without coming on the rates, the matter was put on an entirely different basis. The attractiveness of a "clean city" was one thing, the attractiveness of low rents another.

Objections to Municipal Ownership.

In the limited proposal now considered (Dr. Smart continued) what was being advocated was Government provision of a certain commodity for one class alone, and the ground taken undisguisedly was that Government could provide this commodity more cheaply than private enterprise could, and that this class could not afford more. There were two propositions here which could not be allowed to pass without examination; the first was that there was a class which could not afford the higher rent; the second, that this was a valid reason for the municipality providing them with a lower one. (1) Somewhat to the surprise of the Glasgow Municipal Commissioners, it was given in evidence that, while wages generally had risen, there were labourers in Glasgow who were not earning more than 17*s.* a week—and these not casual labourers, but able-bodied men, in regular employment, and of ordinarily steady habits. His reason for doubting if even this class "could not afford" 6*d.* a week extra for a house was that one of the causes, perhaps the principal one, why such men earned only 17*s.* was that they lived in conditions which lowered health and efficiency, and made them inefficient workers. He fully acknowledged that such people could not pay 6*d.* extra for the rent of a slum such as they were occupying, but he could not forget the "productive value" of the modern higher-rented house. It seemed to him that fresh air, and quiet sleep at nights, and surroundings which would react on the character and conduct of the person on whom so much depended—the wife—might easily add far more than 6*d.* to the earning power of the household. There was, unhappily, a class to whom this did not, directly at least, apply. There were thousands of women workers whose wages were not 17*s.*, but an average of 12*s.* To these a good house would have a greater "productive value" than to men, for they were more subject to the illnesses and little ailments and depression which docked their wages by hours in the day and days in the month. So far as he could see, they were outside the housing question altogether, from the fact that they could not afford an independent house even at the lowest municipal rents. They must remain in the family as subsidiary wage-earners, or club together, or lodge. (2) But, assuming the very strongest case—that there was a class of unfortunate people who absolutely could not afford to pay 6*d.* a week more, he should still say that this in itself was no reason why the municipality should build. To supply them with houses under the market rate would be to introduce a new precedent and principle into Government industries which would lead us far. It would be using the credit of the entire body of the ratepayers to subsidize one small class of them; it would be, in essence, similar to the old legislation which kept down the price of bread when the harvest was bad, without the extenuation that such a measure kept down the price to everybody. It would be a rate in aid of wages. And if there was any lesson to be learned from the bitter experience of a century ago, it was that the evil of a rate-in-aid was, not so much that it punished those who had to subscribe to it, as that it punished those who received it, in that it effectually prevented wages from rising. Unfortunately there was in all large cities a class who, from physical and mental disqualifications, from want of education and technical opportunity, and from want of organisation, must take very much the lowest wage which would keep them in life and moderate animal efficiency; and this class tended to be in oversupply from the fact that misfortune drained into it the failures of all the other classes. For a municipality to give these unfortunate people houses 6*d.* a week cheaper was to allow of them accepting 6*d.* a week less of wage than the circumstances would otherwise force the employer to give. As Mr. Booth said:—"The poverty of the poor is mainly the result of the competition of the very poor." If, then, it became known that, in addition to the other attractions of a city, good houses at slum rents were assured to every one who was poor enough, it seemed inevitable that this would further tempt the influx of unskilled labour—and, unhappily, farm labour, skilled in its own fields, became unskilled when transferred to the streets and factories.

Dr. Smart concluded this part of his address by showing that there were circumstances in the evolution of a city like Glasgow which would justify the relaxation of the general principle that municipal house-owning should be avoided.

Early Cretan Civilisation.

Dr. Arthur J. Evans gave an address on a preliminary scheme for the classification and approximate chronology of the periods of Minoan culture in Crete from the close of the Neolithic to the Early Iron Age. He observed that the accumulated results of recent Cretan discovery, and in a principal degree those of the Palace site of Knossos, had greatly added to the data for fixing the comparative chronology of the early Cretan civilisation. To the period between Neolithic times and the Early Iron Age as a whole he proposed definitely to attach the name Minoan as indicating the probable duration of successive dynasties of priest-kings, the tradition of which

had taken abiding form in the name of Minos. The use of the word "Mycenæan" required radical revision, the Mycenæan culture being in its main features merely a late and subsidiary outgrowth of this great "Minoan" style, when the fine motives of the last Palace period were already seen in a state of decadence. This decadence was already observable in the sherds found in the Palace of Tel-el-Amarna about 1400 B.C., and even in somewhat earlier relics associated in Egypt, Rhodes, Mycenæ, and elsewhere, with cartouches of Amenhotep III. and his Queen. The recently discovered cemetery at Knossos showed the less decadent forerunners of this style, though still later than those of the last Palace period, the end of which was thus carried back at least to the close of the sixteenth century B.C.

Dividing this Minoan era into three main periods—early, middle, and late, each with a first, second, and third sub-period—the third late Minoan period might be roughly dated between 1500 and 1100 B.C. The second late Minoan period received its fullest illustration in the remains of the latest Palace period at Knossos. The contents of the recently discovered royal tomb at Knossos included alabaster vessels belonging to the beginning of the eighteenth dynasty, and went to show that the second sub-period might have extended from about 1700 to 1500 B.C. The next was an age of ceramic transition with an earlier system of linear script, and a period when naturalistic art reached its highest perfection in Minoan Crete, as was shown by such masterpieces as the faience relief of the wild goat and its young. It could be placed approximately between 1900 and 1700 B.C.

The "Middle Minoan" Age was especially characterised by the development of the polychrome style of vase painting on a dark ground, and was the period of the conventionalised pictographic script that preceded the linear. The so-called "Kamares" style flourished in the second Middle Minoan period, the beginning of which was approximately dated by the painted sherds found by Professor Flinders Petrie at Kahun, dating from the time of Usertesen II. of the 12th dynasty—*i.e.* about 2300 B.C., or, accepting the chronological calculations of Professor Petrie and others, the date would be nearly 2700 B.C. The Kahun deposit included objects of the simpler style belonging to the First Middle Minoan Period. Allowing some time for the gradual development of the fine Middle Minoan polychrome style, the beginning of the first period of this great age might reasonably be thrown back at least to the middle (perhaps to the beginning) of the third millennium B.C. Beyond this date lay another long cycle of nascent culture included in the various phases of the Early Minoan Period. The prevailing decorative style was now geometrical, generally dark ornament on a light ground, but the dark glaze slip itself went back to the confines of the Neolithic Period. The lowest or sub-neolithic stratum there brought out showed light-ground technique already beginning as a consequence of the introduction of the potter's oven. The spiral also now appeared for the first time on steatite vessels and incised pottery. This period was characterised by its special class of seal stones with pictographic designs in their more primitive stage. Many seals showed the adaptation of motives from a sixth dynasty class of button seals.

These and other Egyptian connections showed that it would not be safe to bring down the beginnings of the Early Minoan culture later than the middle of the fourth millennium before our era. The section in the west court of the palace showed the earliest Minoan floor level at a depth of 5·32 mètres below the surface. Below this again were at that point 6·43 mètres of neolithic strata. Assuming that the average rate of deposit was fairly continuous, this gave an antiquity of about 12,000 years for the earliest neolithic settlement in Knossos.

Exploration in Crete.

Mr. R. C. Bosanquet, Director of the British School at Athens, described with lantern-slide illustrations this year's excavations at Heleia (Palaikastro) and Praisos in Eastern Crete. The late palace yielded an important series of painted vases and terra-cotta figures; while in the town very valuable finds were two delicately carved ivory statuettes, a large bronze ewer, and a richly painted bath. In the cemeteries were found seals of ivory and steatite, a miniature gold bird, small models of a dagger and of sickles, beaked jugs, and a remarkable clay model of a boat. A later cemetery, containing larnax burials, yielded bronze implements, beads, and vases like those in the palace magazines. Mr. Bosanquet also described numerous architectural inscriptions found during the researches at Praisos, the most important one being in the ancient Eteocretan language, hitherto known only from one or two inscriptions, and being in Greek characters of the third or fourth century before our era.

REVIEWS.

ENGLISH ARCHITECTURE.

English Architecture. By Thomas Dinham Atkinson. 8o. Lond. 1904. *Price* 3s. 6*d. net.* [*Methuen & Co., 36, Essex Street, W.C.*]

A handy little text-book or primer of English Architecture, suited to the requirements of students, professional and amateur alike, written and illustrated by Mr. Thomas D. Atkinson, of Cambridge, has recently been published by Messrs. Methuen. At the outset, let me give it a cordial welcome, and express the hope that it may meet with a large circulation. It is just the volume required to place in the hands of a youth entering upon his

articles, who is wishful to obtain an elementary knowledge of the architecture of his own country.

Following Rickman's "Attempt to Discriminate the Styles of Architecture in England from the Conquest to the Reformation," for a lengthy period Parker's "Introduction to the Study of Gothic Architecture" has been in vogue as a text-book, and its popularity has been well deserved. It has been a stepping-stone in the pursuit of knowledge to many a youthful architect during the latter half of the nineteenth century, and long may it continue to flourish. There is room, however, in the present day for other handbooks dealing with the subject on somewhat different lines and approaching it from a modern standpoint, in which due importance is given to the gradual growth and evolution of the art.

This want has been largely met by the arrival of Mr. Atkinson's little book, which not only treats upon English Architecture from Saxon times to the age of Elizabeth, but also extends the survey through the period of the Renaissance to the end of the eighteenth century. Mr. P. Leslie Waterhouse, it is true, in his popular "Story of Architecture," has done something in this direction, but his little work does not confine itself only to English buildings. On the other hand, in its brief way it is all-embracing, and, beginning with the Egyptian Pyramids, finishes with the description of an American "sky-scraper."

Returning to Mr. Atkinson's volume, an interesting Introduction, which should certainly be read, serves as a prologue to his further discourse. This is followed by three chapters descriptive of the characteristics of English Architecture, which he classifies under the headings of Romanesque, Gothic, and Renaissance, and deprecates the customary practice of dividing English mediæval architecture into several distinct styles, which suggests the idea of "definite breaks in the continuity of the art." The information, which might be amplified with advantage in a further edition, is conveyed in a readable manner, and is supplemented by some capital illustrations from sketches by the author. Plans showing the methods and development of vaulting during the Gothic period, accompanied by a lucid and not too technical description, increase the value of the second chapter: also adding to its interest is a sketch of the development of window tracery. Like all of us, Mr. Atkinson has his preferences and his prejudices. Speaking of thirteenth century "geometrical" tracery, he says, "it is at this period that tracery reaches its highest perfection of beauty and fitness." His opinion will probably be shared by others, but much as we may admire the "perfect tracery" of the triforium arcades of Westminster, some of us take an equal delight in the "flowing tracery" of the later Decorated period, such as is seen in the magnificent west window of York Minster.

In the chapter on English Renaissance, whilst full justice is done to the genius of Inigo Jones as an artist, Wren's abilities, the largeness of his general conceptions, and the ingenuity he displayed in the solution of difficulties are fully recognised. The masterly plan of the latter for rebuilding the City of London after the Great Fire is given microscopically on page 85. Surely, for purposes of examination, it demanded a full-page illustration.

In referring to the architects who flourished during the latter part of the eighteenth century, are not the brothers Adam treated rather below their deserts? Can it be seriously maintained that a "combination of the finicking and the dull culminated in their work," and is not the assertion rather too sweeping? Of the four brothers, Robert Adam would generally be acknowledged to be an artist whose interior decorative work is characterised by much beauty and refinement.

Chapters IV, V, and VI are devoted to a description of churches, monasteries, and houses respectively, in which their development in each case is traced in a logical manner, and a large amount of knowledge is brought to bear upon the subject.

The growth and additions to the parish church of Coton from Norman times to the present day are illustrated on page 121; figs. 152 and 155 give us plans of the Benedictine monastery at Norwich and the Cistercian buildings at Furness Abbey; and on page 166 we meet with plans of Haddon Hall, a typical Tudor house with two courts.

A comparison drawn between French and English ecclesiastical architecture in mediæval times, some interesting observations on the influences giving rise to local varieties of style and workmanship, and a summary of the history dealt with, form the material of the concluding chapter, which is followed by a valuable appendix.

The latter comprises a chronological list of buildings and architects, a table of the periods of English architecture, and a table of the Religious Orders in England at the time of the general suppression by Henry VIII. The volume is completed by a short glossary and an index.

Reverting to Mr. Atkinson's introduction, where he mentions several works which can be recommended to architectural students for further study, he concludes by saying, "However delightful books may be, and necessary as they are in some branches of the art, the true way to study architecture, the only really satisfactory way, and by far the most attractive, is the close examination of the buildings themselves."

Most excellent advice, to which I should like to add a postscript. If the student wishes to impress upon his memory what he has seen, let him be accompanied by his sketch book and measuring rod, and—shall I say it?—leave his camera at home! At any rate, if the camera is taken, let it occupy a merely secondary place in his equipment. The photographic print should never take the place of the student's drawing.

Leeds. WILLIAM H. THORP.